

In the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1 1. (Currently Amended) A method of performing a Fast Fourier
2 Transform in a data processing apparatus having a data cache
3 smaller than the data set of the Fast Fourier Transform, comprising
4 the steps of:

5 dividing said input data into R continuous data sets where
6 each of said R continuous data sets fit within the data cache;
7 disposing said input data into memory, each R continuous data
8 set in continuous memory locations with a space in memory locations
9 from an end of one continuous data set to a beginning of a next
10 continuous data set equal to the size of a cache line;

11 separately and independently performing a first stage radix-R
12 butterfly computations on all the ~~input data~~ the R continuous data
13 sets thereby producing R independent intermediate data sets each of
14 which fits within the data cache; and

15 successively performing second and all subsequent stage
16 butterfly computations on each independent intermediate data set in
17 turn producing corresponding output data.

2. (Canceled)

1 3. (Original) The method of claim 1, wherein:
2 said radix-R is radix-2.

1 4. (Original) The method of claim 1, wherein:
2 said radix-R is radix-4.

5. (Canceled)

1 6. (Currently Amended) The method of performing an N-point
2 radix-R Fast Fourier Transform in a data processing apparatus
3 having a data cache comprising the steps of:

4 comparing the data set of input data and twiddle factors with
5 the size of the data cache;

6 if said data set is smaller than said data cache, performing
7 said Fast Fourier Transform in $\log_2 N$ stages on all the data set in
8 one pass; and

9 if said data set is larger than said data cache but smaller
10 than R times the data cache

11 dividing said input data into R continuous data sets
12 where each of said R continuous data sets fit within the data
13 cache;

14 disposing said input data into memory, each R continuous
15 data set in continuous memory locations with a space in memory
16 locations from an end of one continuous data set to a
17 beginning of a next continuous data set equal to the size of a
18 cache line;

19 separately and independently performing a first stage
20 radix-R butterfly computations on all the ~~input data~~ the R
21 continuous data sets thereby producing R independent
22 intermediate data sets in a first pass each of which fits
23 within the data cache; and

24 successively performing second and all subsequent stage
25 butterfly computations on each independent intermediate data
26 set in turn producing corresponding output data in second
27 passes.

1 7. (Original) The method of claim 6, wherein:

2 said Fast Fourier Transform uses complex input data and
3 complex twiddle factors of M bytes each; and

4 said step of comparing the data set with the size of the data
5 cache compares the data cache size to 4 N M bytes.

1 8. (Original) The method of claim 6, wherein:
2 said radix-R is radix-2.

1 9. (Original) The method of claim 6, wherein:
2 said radix-R is radix-4.

3 10. (Canceled)

1 11. (Original) The method of claim 6, further comprising:
2 if said data set is larger than R times the data cache
3 performing I initial stages of radix-R butterfly
4 computations on all the input data producing R independent
5 intermediate data sets, where I is the next integer greater
6 than $\log_R(D/C)$, D is the size of the data set and C is the
7 size of the cache; and
8 successively performing all subsequent stage butterfly
9 computations on each independent intermediate data set in turn
10 producing corresponding output data in second passes.